

(No Model.)

A. C. EVANS.

HARROW.

No. 281,755.

Patented July 24, 1883.

Fig. 1.

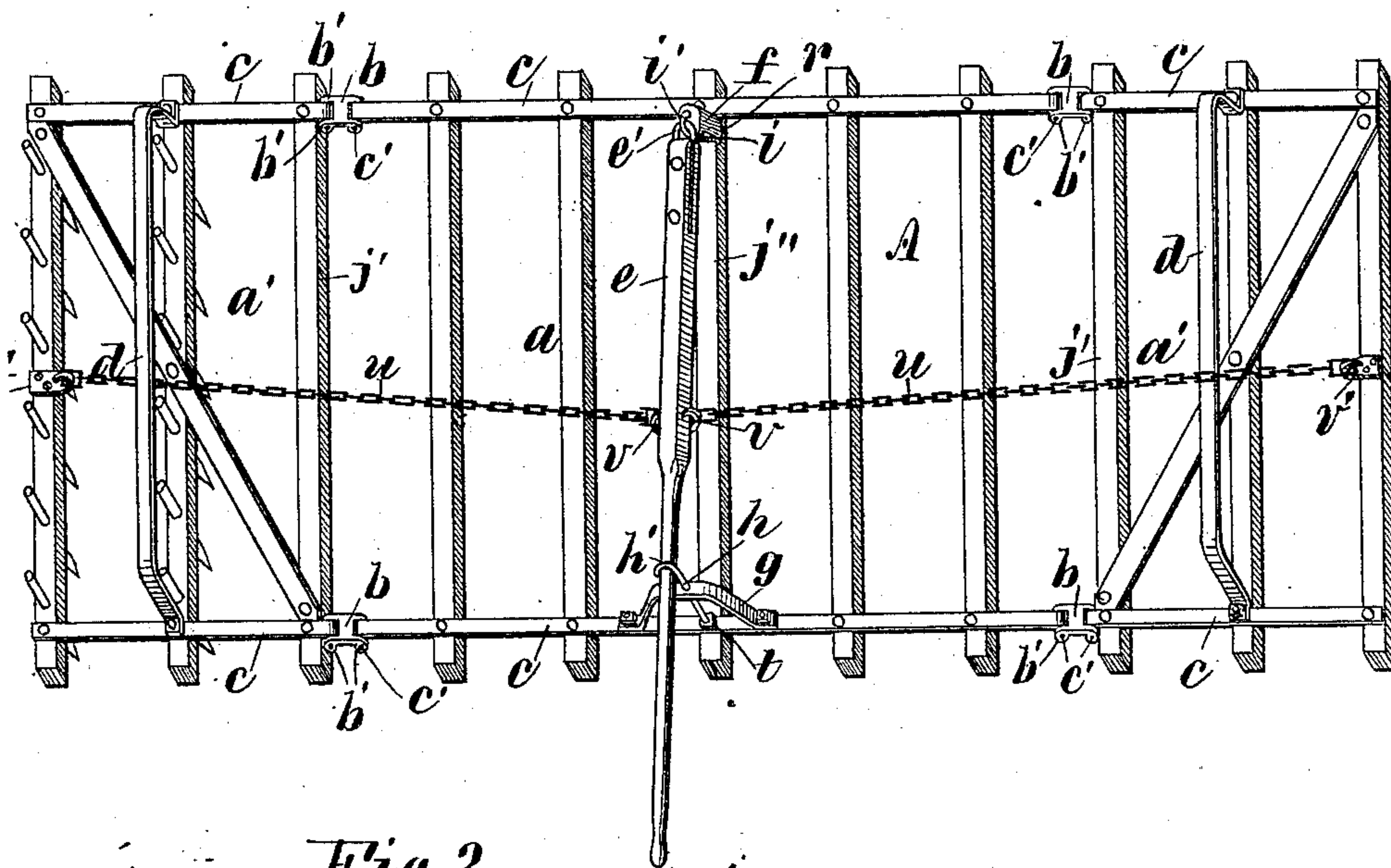


Fig. 2.

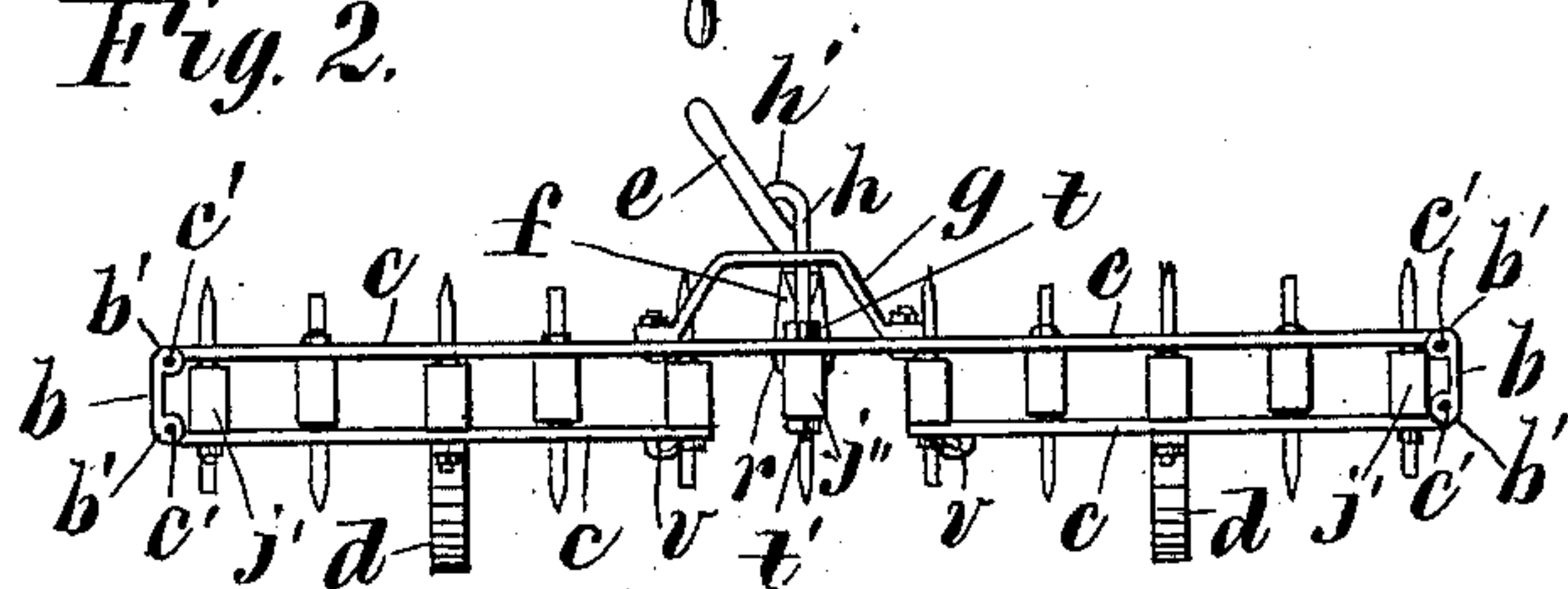


Fig. 3.

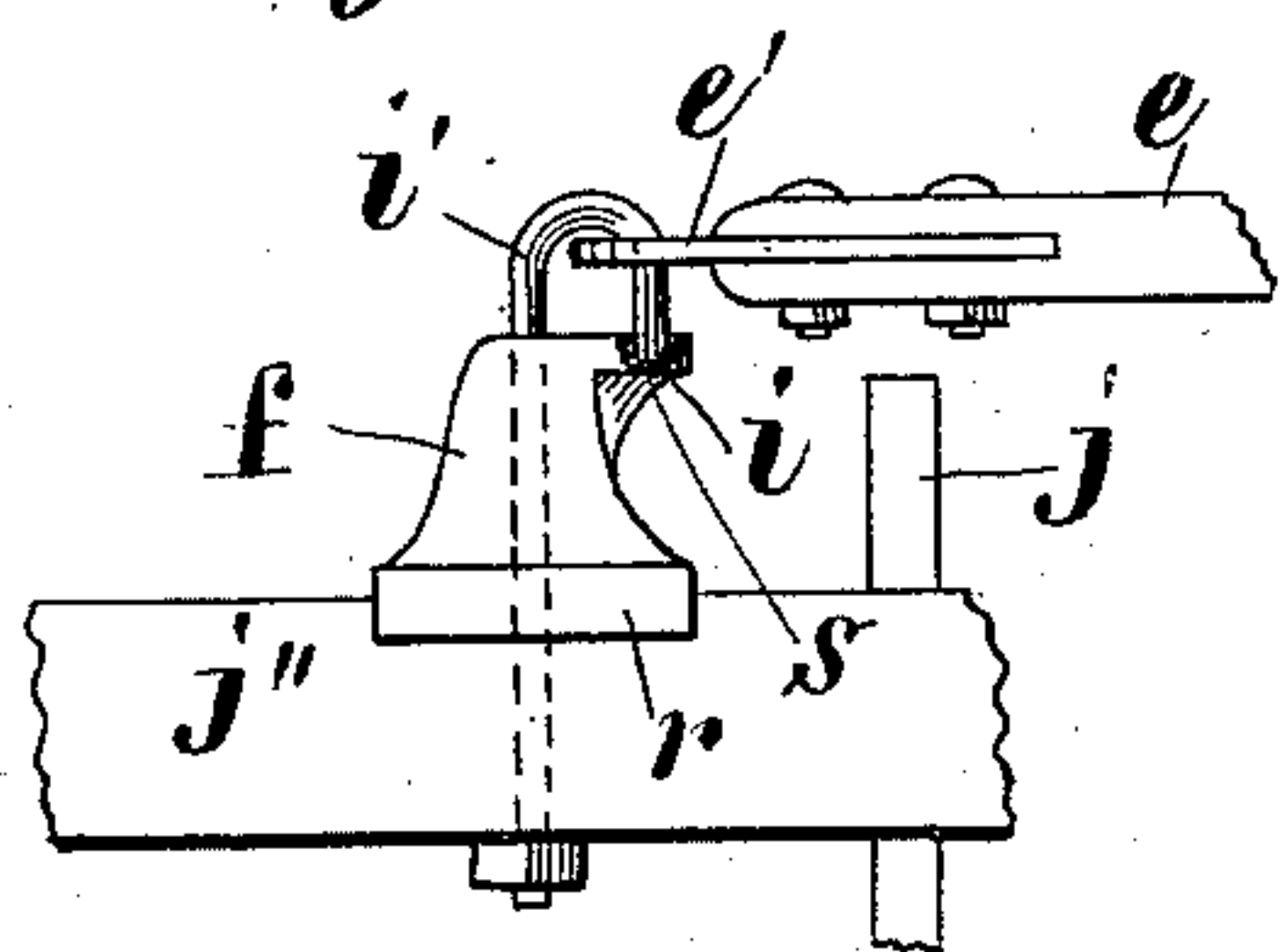


Fig. 4.

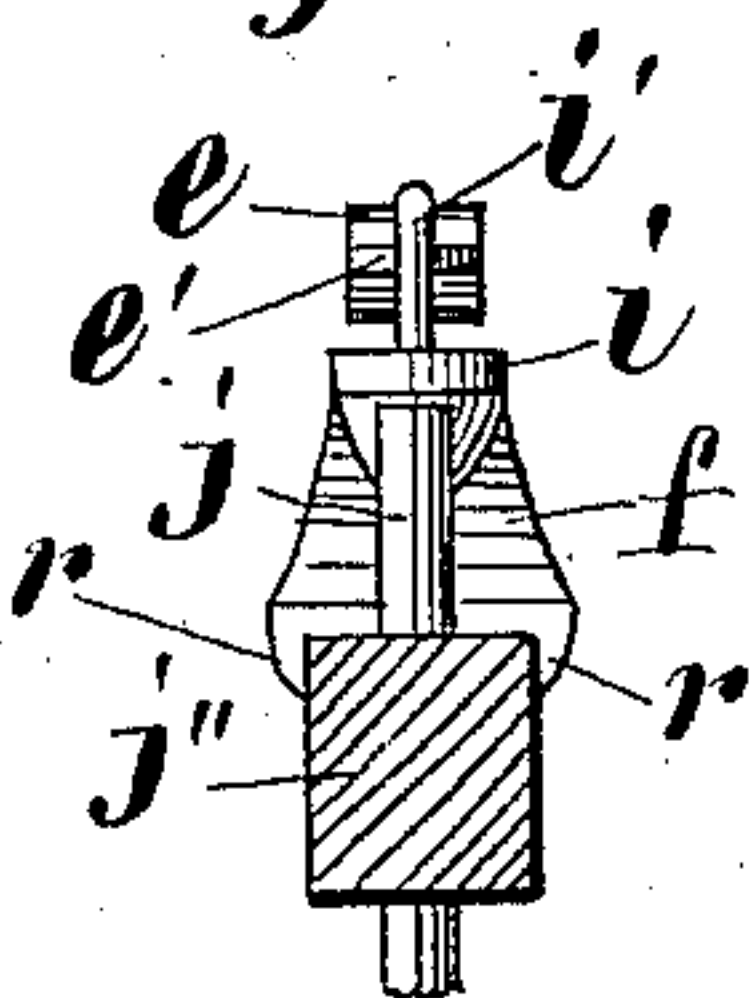


Fig. 5.

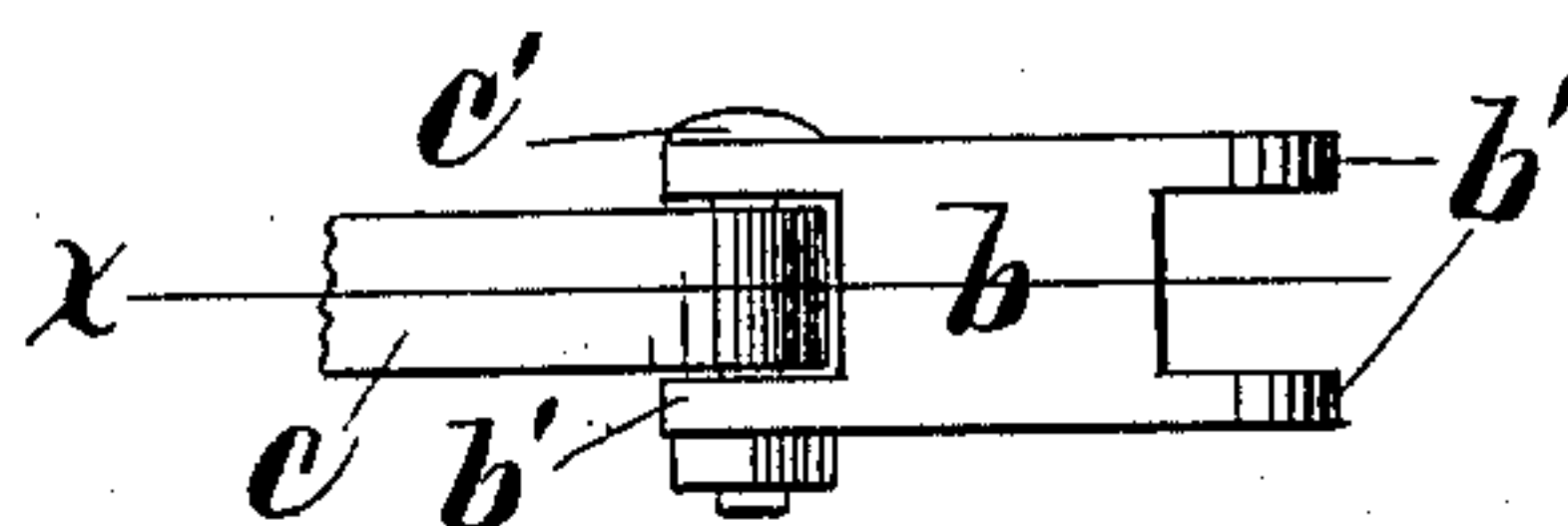


Fig. 6.



Attest

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UNITED STATES PATENT OFFICE.

AUSTIN C. EVANS, OF SPRINGFIELD, OHIO.

HARROW.

SPECIFICATION forming part of Letters Patent No. 281,755, dated July 24, 1883.

Application filed May 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, AUSTIN C. EVANS, a citizen of the United States, residing at Springfield, in the county of Clarke and State of Ohio, have
5 invented certain new and useful Improvements in Harrows; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and
10 use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in
15 harrows.

My invention relates to that class of harrows made in sections, flexibly connected together, and operated by a lever pivoted or flexibly connected by its front end to the central section, and having chains or their equivalents connecting said lever with the outside
20 sections, whereby the latter are operated in raising or lowering the same.

My invention applies more particularly to
25 a three-section harrow.

My invention relates, further, to a harrow having its sections flexibly connected together and adapted to be folded for transportation, and it is an improvement on my former patent,
30 dated November 1, 1881, No. 248,850.

My invention consists in certain improvements in the connections of the lever used for manipulating the harrow-sections, and in the means for securing the same when not in use;
35 also, in the construction and arrangement of the sections; also, in the location of the runners; also, in the flexible connections between the sections which allow the sections to be folded more compactly together.

The object of my invention is to simplify the lever-connections so as to handle the harrow with greater ease, and also to equalize the weight of the harrow and to permit it to be folded so as to bring the runners nearer together, to accomplish which the runners are
40 bolted vertically in reversed position upon the top of the wing or folding sections to allow said runners to assume their proper position when the outside sections are folded down
45 under the middle section, and to allow the beams of said outside sections to alternate with

those of the middle section, so as to lie in the same horizontal plane when folded.

Figure 1 is a perspective view of a harrow of three sections with my improvements thereon. Fig. 2 represents the same harrow folded
55 for transportation. Fig. 3 is a detail view of the front connection of the lever with the central harrow-section. Fig. 4 is an end view of the same. Fig. 5 is a top view of the link-coupling (or double hinge-joint) which connects the harrow-sections. Fig. 6 is a section of same through line *x*, Fig. 5.

A is the harrow, having a middle section, *a*, constructed with five longitudinal beams, and
60 a wing-section, *a'*, on either side, flexibly attached to the former with three beams each. A link, *b*, pivoted at either end to the bent ends of strap-irons *c*, connects the sections.

It will be noticed that the iron bars or straps
70 *c* on the ends of the middle section, *a*, project upon either side almost the entire distance between the outside beam of this section and that of the wing-section, so as to bring the link-coupling *b* close up to the beam *j'* of said
75 outside section. This is done to adapt the sections *a'* to fold so that their beams shall alternate with those of section *a*, as seen in Fig. 2. By thus making the joint next to the inside beam of the wing-section the latter can be fold-
80 ed down with its beams in line with those in section *a*, and the outside beams will not reach to the middle line of section *a*, but will leave its center beam, *j''*, clear of the wing-sections. This allows the harrow to be transported with
85 more ease and without danger of unfolding.

The runners are of the usual bent form, and are attached in reverse position over and in line with the middle beam of each wing-section, and when the latter are folded under the
90 middle section these runners are about the proper distance apart to support the harrow. By reference to Fig. 2 it will be noticed that when the harrow is folded the beams of the wing-sections fold in between the beams of the
95 middle section, so as to bring all the beams of the harrow into the same plane and in line with each other.

A lever, *e*, similar to that shown and described in my former patent, (before men-
100 tioned,) extends from front to rear over the central longitudinal line of the harrow. Its front

end is connected by a clevis-coupling through the block *f* to the front end of the harrow-beam *j''*. Block *f* is of cast metal, in form something like the rear half of an anvil. It sets upon the top of the beam, and has flanges *r*, extending downward from it, upon either side of the latter, to prevent lateral displacement, and is held to the beam by a hook-bolt, *i'*, which extends down through it and the beam, and is fastened by a nut. The hook end of this bolt extends down into a shallow hole or seat, *s*, in the rearward extension, *i*, of the block *f*, in line with its stem, and the other half of the clevis *e'* connects with it horizontally, so as to allow a free horizontal movement of lever *e*, to which the loop-plate *e'* is fastened. The hook-bolt *i'* presents the form of a vertical staple, with its two limbs in line with the central beam, *j''*. At the rear, lever *e* is held by a simple plain downwardly-turned hook, *h*, which extends from the rear of the harrow-beam *j''*. Its lower part is threaded, and a nut, *t*, on top of the strap *c*, and nut *t'* under the beam, fasten it securely in its place. It extends up through a flat arched bar, *g*, which latter supports the rear end of the lever *e*, as seen in Figs. 1 and 2. The bar *g* is bent in the form of a flat arch, and its top is high enough above the beams to bring the handle end of lever *e* within easy reach of the operator.

The lever is kept in its place by the chains *u* on either side, which extend from the hooks *v* on the lever to the hooks *v'* on the outside beams of the harrow, these chains being kept stretched tightly except when the harrow is folded.

The hook *h'* at the top of the bolt *h* allows the lever to slip under, so as to engage with it, to enable the operator to raise the rear end of the harrow. This device is much more simple and is more cheaply made than the "fork" and "hook" in my former patent before referred to, besides allowing the operator to use the lever in elevating either side section of the harrow without the necessity of raising it out of a fork (shown in former patent) before giving it the necessary side motion for that purpose. The connection or coupling at the front end of lever *e* is also simplified, and allows greater freedom of movement to the lever than the "guideway" seen in the former patent before referred to. To release the lever a longitudinal or end thrust was necessary, which in this construction is entirely obviated. The link *b*, which hinges the harrow-sections together, is cast with a pair of ears, *b'*, on each end, and the curled ends of the strap-irons *c* are pivoted between these ears by a bolt, *c'*, as seen in the detail views, Figs. 5 and 6. The distance between the two pivot-bolts *c'* of the hinge is equal to the thickness of the beams, allowing sections *a'* to fold flat upon the under side of section *a*, the beams in one section lying upon the strap-irons in the other, as the beams in

the wing-sections alternate with those in the central section.

I claim as my invention—

1. A folding harrow in which the beams of the folding sections alternate with the beams of the section upon which they are folded, lying between the beams of the latter upon their connecting strap-irons, whereby all the beams of the harrow are brought into the same plane and in line with each other by the operation of folding the sections.

2. The combination, with the beam *j''*, of section *a* and lever *e*, having the horizontally-bent loop *e'* extending therefrom, of the block *f*, having flanges *r* for securing it from lateral movement on the beam, and hook-bolt *i'*, extending vertically through said block and beam, securing the same together, and having its short limb extending through loop *e'* into seat *s* in the top of said block, and its two limbs in the central longitudinal line of the harrow, as set forth.

3. In a folding harrow having a lever pivoted over the center of its middle section and connected by chains with the wing-sections, the combination, with said lever and the central beam of the middle section, of a flanged block intermediate between them, and a detachable hook-bolt extending vertically through said block and beam, securing them together, and connected with the loop end of said lever, as set forth.

4. In a folding harrow having a lever pivoted over the middle section, connected by chains with the wing-sections, and adapted to be operated toward either side by a horizontal movement in elevating said wing-sections, the combination, with the middle section, the pivoted lever, and its connections, of the flat arched bar for supporting the rear end of the latter and allowing freedom of its movement, having the hook extending above the same, and adapted to engage with said lever in raising the rear end of the harrow, as set forth.

5. The combination, with harrow-sections *a* and *a'*, having the connecting strap-irons *c*, of the links *b*, of like length with the thickness of the harrow-beams, to adapt the latter to all lie in the same horizontal plane when the sections are folded together, as shown and specified.

6. In a harrow having its sections flexibly connected together by a link-coupling of equal length with the thickness of the harrow-beams, the arrangement of the latter in the central and wing sections, whereby they may alternate when folded and all lie in the same horizontal plane.

7. In a harrow having its sections flexibly connected and adapted to be folded together, a single reversed runner located vertically upon the top of each wing-section to allow it to assume the proper upright position for supporting the harrow when the sections are folded for transportation, as specified.

8. The combination, with the wing-sections,

of the vertical (reversed) runners located there-
on, whereby said runners are adapted to sup-
port the entire harrow when said sections are
folded under the middle section into the same
5 or in parallel planes.

9. In a harrow having its sections flexibly
connected together and adapted to be folded
as described, the combination, with the cen-
tral section, *a*, having the flexible connections

b, of the wing-sections *a'*, having the vertical 10
(reversed) runners *d* thereon, as and for the
purpose hereinbefore set forth.

In testimony whereof I affix my signature in
presence of two witnesses.

AUSTIN C. EVANS.

Witnesses:

B. C. CONVERSE,

G. M. GRIDLEY.